



Colorado Department  
of Public Health  
and Environment

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# Citizen's Summary

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## Analysis of Diagnosed vs. Expected Cancer Cases in Residents of the Vasquez Boulevard/I-70 Superfund Site Study Area

### BACKGROUND

The Vasquez Boulevard and I-70 Superfund Site (VB/I70), covering a four-square-mile area in north-central Denver, incorporates the neighborhoods of Swansea, Elyria, Clayton, Cole, and southwest Globeville.

Elevated levels of arsenic and lead have been detected in area soils and are believed to have come from historic smelting activities in the area. Smelters operated at various times from the 1870's through the 1950's. Arsenic may also be associated with lawn care products that were commonly used before they were banned in the 1970's.

This fact sheet presents the findings of a cancer occurrence study performed for the area by the Colorado Department of Public Health and Environment. This study was requested by various citizen and neighborhood groups.

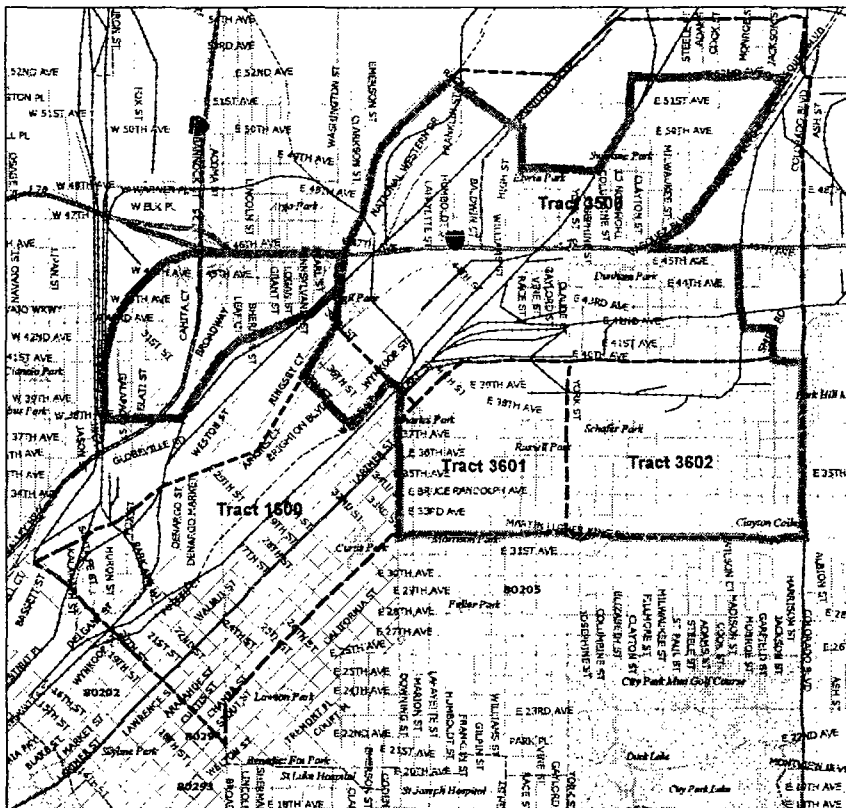
### STUDY DESIGN

The study used existing cancer surveillance data available from the Colorado Central Cancer Registry (CCCCR) to investigate cancer rates in VB/I70 neighborhoods. All cancers diagnosed in Colorado are reported to the Cancer Registry with the exception of non-melanoma skin cancers. Over 17,000 new cases of cancer are registered annually in Colorado, and, on average, approximately one in three Coloradans will develop cancer in their lifetime. Cancer surveillance allows public health officials to investigate whether cancer is occurring in numbers that are significantly higher than background rates.

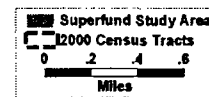
This study looked at all cancers reported to the Cancer Registry from 1982 to 1998 for individuals living within the Superfund Site area. Census Tracts 35.00, 36.01, 36.02, and a small portion of 16.00 were used to define the study area (*see map*). Cancer rates for the greater Denver metropolitan area were also calculated for the same time period, and were used as a standard for comparison. Other factors possibly related to the cause of different types of cancers, known as risk factors, were identified from the epidemiological literature and from Cancer Registry records.

The primary focus of the study was to investigate lung and bladder cancer in the study area. Scientists looked at lung and bladder cancer because they have been identified in other studies as being associated with arsenic exposure. The total number of all types of cancers registered in the VB/I70 study area was also compared to the background rate in the rest of the Denver metropolitan area.

Additional investigation was done to see if there was evidence of a link between the level of arsenic in soil and observed increases in certain types of cancer.



**Figure 1**  
**Vasquez Boulevard / I-70**  
**Census Tract Boundaries**



## STUDY RESULTS FOR TYPES OF CANCER ASSOCIATED WITH ARSENIC

Investigation of the types of cancer with a known association with arsenic exposure - lung and bladder cancer - showed mixed results. Bladder cancer did not occur in higher numbers than expected for any of the neighborhoods in the VB/I70 study area.

Lung cancer was higher than expected in men living in the Cole neighborhood (Census Tract 36.01), but was not statistically elevated in men in other neighborhoods, or in women in any of the neighborhoods within the VB/I70 study area. Smoking appeared to play a significant role in the high number of lung cancers that occurred in men in the Cole area. All of those diagnosed with lung cancer for whom smoking status could be determined were smokers. A combined effect from exposure to both arsenic and tobacco smoke may also have contributed to a higher risk of developing lung cancer for some individuals, but this cannot be confirmed or ruled out based on this study. Any such combined effect would likely be small compared to the risk from smoking alone.

An investigation of the level of arsenic in soil at homes where individuals were diagnosed with lung cancer did not indicate an association between arsenic and the occurrence of lung cancer.

## **STUDY RESULTS FOR OTHER TYPES OF CANCERS**

Investigation of all cancer types registered in the study area from 1982 to 1998 suggest that there is a generally higher than expected rate of cancer in the VB/I70 area. Other types of cancer that are statistically elevated include cervical, colorectal, pancreas, breast, "other pharynx", larynx, brain and other nervous system cancers, and multiple myeloma.

There is no known link between arsenic exposure and higher rates of any of these types of cancers. Studies indicate that these cancers are mostly associated with other risk factors such as smoking, dietary habits, alcohol consumption, viral infections, other predisposing genetic factors, or family history of cancer. Other factors such as exposure to carcinogens in occupational, indoor, and ambient air may also contribute to the overall individual and population risk of some of these cancers.

There was no evidence in this study of a clustering of these cancers in any one neighborhood. In Elyria and Swansea (Census Tract 35.00), breast and pancreas cancer was statistically elevated in women, and "other pharynx" cancer was elevated in men. There was a high number of second breast tumors reported for Hispanic women, and several cases occurred in women under the age of 45. Increased risk of developing a second breast tumor and developing cancer at a younger age have been associated in other studies with genetic predisposition and a family history of breast disease.

In the Cole neighborhood (Census Tract 36.01), larynx cancer was statistically elevated in women, and the number of brain cancers was high for men and women combined. Most of the brain cancers occurred in individuals under the age of 20 years old. A variety of childhood brain cancer risk factors have been proposed in the medical and epidemiological literature, including having parents who worked in agriculture or other jobs involving exposure from motor vehicles or electricity, and use of pesticides in and around the home. Few risk factors have been consistently confirmed in repeat studies, with the exception of ionizing radiation, such as exposure to x-rays, and other congenital and genetic disorders. Exposure to arsenic has not been linked to an increased risk of brain cancer.

Multiple myeloma was statistically higher than background rates in women in the Clayton neighborhood (Census Tract 36.02), with cases occurring in the older segment of the population.

Numbers of colorectal and cervical cancer were slightly higher than background rates in each of the individual neighborhoods in the VB/I70 study area, resulting in a statistically high number of cases when data from all neighborhoods were combined.

The study also found that breast and cervical cancer were detected in VB/I70 residents at a later more invasive stage of disease when survival may not be as good as can be expected with early detection of cancer. This may indicate poor access to medical care in this community.

## **FOLLOW UP ACTIVITIES**

The findings of the VB/I70 cancer study will be communicated to the Comprehensive Cancer Control Section of the Colorado Department of Public Health and Environment, the local health department, and affected neighborhood groups, in an effort to improve cancer control strategies in VB/I70 neighborhoods.

Cancer control strategies may include cancer education efforts and outreach to these communities to better characterize the presence of known and potential cancer risk factors. An effort will also be made to work with grassroots neighborhood organizations to inform them of opportunities to enhance

screening activities in their neighborhoods, particularly for those without other access to medical care.

Finally, the Health Department's Environmental Epidemiology Section will work with Cancer Registry staff to provide continued monitoring of cancer surveillance data to monitor for any general trends or patterns of cancer occurrence in the VB/I70 area.

## CONTACT INFORMATION

For more information or to obtain copies of the full technical report contact:

Derek Boer  
Public Information Specialist  
Colorado Department of Public Health and Environment  
tel. 303.692.3329  
[Derek.boer@state.co.us](mailto:Derek.boer@state.co.us)

Jane Mitchell  
Environmental Health Researcher  
Colorado Department of Public Health and Environment  
tel. 303.692.2644  
[jane.mitchell@state.co.us](mailto:jane.mitchell@state.co.us)

## Glossary

**Epidemiology** – The study of the distribution and controlling factors of diseases in human populations.

**Multiple myeloma** – A type of cancer that is characterized by the overgrowth and malfunction of plasma cells in the bone marrow.

**“Other Pharynx” cancer** – A specific classification that includes cancer of the tonsil, oropharynx, and hypopharynx, including the pyriform sinus.

**Risk factors** – Aspects of personal behavior or life-style, an environmental exposure, or an inborn or inherited characteristic whose presence, based on epidemiological evidence, is associated with an increased likelihood that a disease will develop at a later time.

**Statistically significant elevation** – An increase in the occurrence of a type or group of cancer that is unlikely, with 95 percent certainty, to be due to chance alone.